AMENDMENTS TO THE CLAIMS:

The listing of claims will replace all prior versions, and listings of claims in the application:

LISTING OF THE CLAIMS

1. (Canceled)

2. (Currently Amended) The method of halftoning defined in claim 4 [1] wherein the substantial majority is approximately 75% or more of the pixels turned on to render a tone.

3. (Currently Amended) The method of halftoning defined in claim 4 [1] wherein the substantial majority is approximately 90% or more of the pixels turned on to render a tone.

4. (Currently Amended) ~~The~~ A method of halftoning by an image processing unit (IPU) for multi-pass rendering wherein different pixel locations are rendered in each pass ~~defined in claim 1 further~~ comprising:

generating a stochastic screen pixel turn-on sequence of turn-on sequence values representing the turn-on sequence order for corresponding image pixels; ~~and~~

partitioning the stochastic screen pixel turn-on sequence into a plurality of partitions, wherein each partition corresponds to a different pass of a multi-pass printer used in printing the image;

re-ordering the stochastic screen pixel turn-on sequence to restrict a substantial majority of the pixels turned on to render a tone to the minimum number of passes required to produce the tone in the image; and

generating a stochastic halftone screen using the re-ordered stochastic screen pixel turn-on sequence.

5. (Canceled)

6. (Canceled)

7. (Currently Amended) The method of halftoning defined in claim 4 [5] wherein the re-ordering step includes placing the lowest stochastic screen pixel turn-on sequence values in one partition and the highest stochastic screen pixel turn-on sequence values in another partition.

8. (Original) The method of halftoning defined in claim 7 wherein the re-ordering step further includes:

a) replacing the lowest stochastic screen pixel turn-on value before re-ordering contained in one partition with a replacement value which is the lowest stochastic screen pixel turn-on sequence value of all partitions of the screen;

b) replacing the next lowest stochastic screen pixel turn-on value in the one partition with a replacement value which is the next lowest stochastic screen pixel turn-on sequence value of all partitions of the screen;

c) repeating step b) until the one partition is filled with the lowest stochastic screen pixel turn-on sequence values of all partitions; and

d) repeating steps a) through c) to re-order each of the other partitions in turn with the remaining unused replacement values.

9. (Original) The method of halftoning defined in claim 7 wherein the re-ordering step further includes:

a) obtaining a subsequence for each partition by arranging the pixels within the partition in increasing order of turn-on sequence values;

b) concatenating the subsequences for the different partitions, in any order, to form a single sequence; and

c) renumbering the resulting single sequence in increasing order of turn-on values to obtain the new turn-on sequence.

10. (Currently Amended) The method of halftoning defined in claim 4 [5] wherein the partitioning step includes partitioning the stochastic screen pixel turn-on sequence into two partitions.

11. (Original) The method of halftoning defined in claim 10 wherein the partitions are designated $S1$ and $S2$ and the merit function is $\tilde{M}(S) = M(S) + w_1 * M(S1) + w_2 * M(S2)$, where $M(S)$ is a merit function suitable for a single stochastic screen and w_1 and w_2 are weighting factors in the range of 2 to approximately 100.

12. (Original) The method of halftoning defined in claim 11 wherein the partitioning step includes partitioning into a checkerboard partition arrangement.

13. (Original) The method of halftoning defined in claim 12 wherein the step of generating a stochastic screen pixel turn-on sequence includes generating a halftone screen for a checkerboard partition such that the pixels can be classified as belonging to the two partitions using the coordinates of columns and rows, *i* and *j*, and the mathematical rule

$$p(i,j) \in S1, \quad if\,(i+j)\%2 = 0;$$
$$p(i,j) \in S2, \quad if\,(i+j)\%2 = 1;$$
$$S = S1 + S2$$

and optimizing the merit function

$$\tilde{M}(S) = M(S) + w_1 * M(S1) + w_2 * M(S2),$$

where w_1 and w_2 are weighting factors each in the range of approximately 2 to approximately 100.

14. (Original) The method of halftoning defined in claim 13 wherein $w_1 \approx 3$ and $w_2 \approx 3$.

15. (Currently Amended) ~~The~~ A method of halftoning by an image

processing unit (IPU) for multi-pass rendering wherein different pixel locations are rendered in each pass ~~defined in claim 1 further~~ comprising:

providing an input image having a plurality of pixels each having an input tone value;

partitioning the input image pixels into partitions wherein each partition corresponds to a different pass of multi-pass printing; and

processing the input image pixels on a pixel-by-pixel basis using error diffusion halftoning restricting a substantial majority of the pixels turned on to render a tone in the image to the minimum number of passes required to produce the tone including:

adding a zero mean bias signal to each input image pixel tone value having a value based on the partition containing the input image pixel,

adding an error diffused from previously processed pixels to the input tone value of ~~a current~~ each input image pixel being processed to achieve a desired pixel value for the pixel,[;] and

comparing the desired pixel value of each pixel being processed with a threshold value to turn on or not turn on each pixel for rendering the image~~, wherein the restricting step includes adding a zero mean bias signal to the input tone value based on the partition containing the input image pixel~~.

16. (Original) The method of halftoning defined in claim 15 wherein the partitioning step includes partitioning the input image pixels into two partitions.

17. (Original) The method of halftoning defined in claim 16 wherein the partitioning step includes partitioning the input image pixels into a checkerboard partition.

18. (Original) The method of halftoning defined in claim 16 wherein the zero mean bias signal has a value of +D for one partition and -D for the other partition.

19. (Original) The method of halftoning defined in claim 18 wherein the input image tone value can be one of 256 values and the value of D is between approximately 32 and 64.

20. (Currently Amended) ~~The~~ A method of halftoning by an image processing unit (IPU) for multi-pass rendering wherein different pixel locations are rendered in each pass ~~defined in claim 1 further~~ comprising:

providing an input image having a plurality of pixels each having an input tone value;

partitioning the input image pixels into partitions wherein each partition corresponds to a different pass of multi-pass printing; and

processing the input image pixels on a pixel-by-pixel basis using error diffusion halftoning restricting a substantial majority of the pixels turned on to render a tone in the image to the minimum number of passes required to produce the tone including:

adding an error diffused from previously processed pixels to the input tone value of ~~a current~~ each input image pixel being processed to achieve a desired pixel value for the pixel,[;] and

comparing the desired pixel value of each pixel being processed with a threshold value added to a zero mean bias signal to turn on or not turn on each pixel for rendering the image, wherein the zero mean bias signal has a value based on the partition containing the pixel being processed~~, wherein the restricting step includes adding a zero mean bias signal to the input tone value based on the partition containing the input image pixel~~.

21. (Original) The method of halftoning defined in claim 20 wherein the partitioning step includes partitioning the input image pixels into two partitions.

22. (Original) The method of halftoning defined in claim 21 wherein the partitioning step includes partitioning the input image pixels into a checkerboard partition.

23. (Original) The method of halftoning defined in claim 21 wherein the zero mean bias signal has a value of +D for one partition and -D for the other partition.

24. (Original) The method of halftoning defined in claim 23 wherein the input image tone value can be one of 256 values and the value of D is between approximately 32 and 64.

25. (Canceled)

26. (Canceled)

27. (Canceled)

28. (Original) A system for halftoning for multi-pass rendering of an image having pixels, wherein different pixels are rendered in each pass, the system comprising, means for restricting a substantial majority of the pixels turned on to render a tone to the minimum number of passes required to produce the tone.

29. (Original) The system defined in claim 28 further comprising:

a stochastic screen pixel turn-on sequence generator; and

means for partitioning the stochastic screen pixel turn-on sequence into a plurality of partitions each partition corresponding to a different pass, wherein the restricting means includes means for re-ordering the stochastic screen pixel turn-on sequence to restrict a substantial majority of the pixels turned on to render a tone to the minimum number of passes required to produce the tone.

30. (Original) The system defined in claim 28 further comprising:

means for partitioning an input image having a plurality of input pixel tone values into a plurality of partitioned pixel tone values;

means for processing the partitioned pixel tone values to produce a previously processed pixel error diffusion value;

means for processing a current partitioned input pixel tone value including means for adding the previously processed pixel error diffusion value to the current partitioned input pixel tone value to achieve a desired pixel value; and

means for comparing the desired pixel value with a threshold value to produce an output signal for rendering the image, wherein the means for restricting includes means for adding a zero mean bias signal to the current partitioned input pixel tone value, the zero mean bias signal being based on the partition containing the partitioned pixel tone value.

31. (Original) The system defined in claim 28 further comprising:

means for partitioning an input image having a plurality of input pixel tone values into a plurality of partitioned pixel tone values;

means for processing the partitioned pixel tone values to produce a previously processed pixel error diffusion value;

means for processing a partitioned input pixel tone value including means for adding the previously processed pixel error diffusion value to the partitioned input pixel tone value to achieve a desired pixel value; and

means for comparing the desired pixel value with a threshold value to produce an output signal for rendering the image, wherein the means for restricting includes means for adding a zero mean bias signal to the threshold value, the zero mean bias signal being based on the partition containing the partitioned pixel tone value.

32. (New) The method of halftoning defined in claim 4 wherein the image being halftoned includes at least one of image highlights and image shadows and the re-ordering restricts at least one of pixels in the image highlights turned on for printing to a minimum number of partitions needed for rendering the image highlights and pixels in the image shadows not turned on for printing to a minimum number of partitions needed for rendering the image shadows.

33. (New) The method of halftoning defined in claim 4 wherein the partitioning step includes partitioning the stochastic screen pixel turn-on sequence into four partitions for four-pass printing and the re-ordering places a substantial majority of the

lowest pixel turn-on values in the first partition, a substantial majority of the next lowest pixel turn-on values in a second partition, and a substantial majority of the highest pixel turn-on values in the fourth partition.

34. (New) The method of halftoning defined in claim 33 wherein the re-ordering step restricts pixels turned on to render image tones of 0% to 25% to one partition, and restricts pixels turned on to render image tones of 25% to 50% to two partitions, and restricts pixels not turned on to render image tones of 75% to 100% to the fourth partition corresponding to the last printer pass.

35. (New) The method of halftoning defined in claim 15 wherein the image being halftoned includes image highlights and image shadows and the processing the input image pixels on a pixel-by-pixel basis using error diffusion halftoning restricts pixels in the image highlights turned on for printing to one of the partitions and pixels in the image shadows not turned on for printing to another one of the partitions.

36. (New) The method of halftoning defined in claim 20 wherein the image being halftoned includes image highlights and image shadows and the processing the input image pixels on a pixel-by-pixel basis using error diffusion halftoning restricts pixels in the image highlights turned on for printing to one of the partitions and pixels in the image shadows not turned on for printing to another one of the partitions.